

Physics
ELECTROMAGNETISM WITH BROKEN ROTATIONAL SYMMETRY

Ali M Picking, Neil E Russell*
1401 Presque Isle Avenue
Physics Department
Northern Michigan University
Marquette, MI 49855
apicking@nmu.edu

We study ways in which a particle in an electromagnetic field can violate Lorentz symmetry. Calculations are presented using part of the standard-model extension, a Lorentz-violating theory. The violation occurs through fixed vector-like background fields that break the symmetry under rotations and boosts. Unconventional effects are observed through the spin of a particle. By studying a charged particle in a magnetic field, intuition about this theory is gained. We show that the related CPT symmetry is also violated.